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siderable development of the aponeurotic expansions; all peculiarities which approach the reptiles. There is nothing resembling the diaphragm of mammals.

PHYSIOLOGY.¹

THE NEW CORPUSCLE OF THE BLOOD AND ITS RELATION TO COAGULATION.—It was the view of Alex. Schmidt that the fibrin of clotted blood was a compound formed by the union of two fibrin factors, fibrinoplastin and fibrinogen, under the influence of a third body, fibrin ferment. A number of reasons led to the belief that one or more of the bodies necessary to the formation of fibrin was derived from disintegrated white blood corpuscles. Schmidt taught that fibrinoplastin and fibrin ferment owed their origin to the breaking down of white blood corpuscles or allied forms, while fibrinogen was present in normal circulating blood plasma.

Later, Hammarsten claimed that the whole of the fibrin was derived from fibrinogen alone under the action of the fibrin ferment, and both of these bodies were products of disintegrated leucocytes. Of late years a number of observers have independently described, in accounts which agree more or less perfectly, a morphological element of the blood which differs in its characters from both the white and the red corpuscles.

Bizzozero, whose paper was awarded the prize offered by an Italian scientific society for the most valuable contribution to our knowledge of the causes of the coagulation of the blood, describes this third morphological element of the blood as a colorless disk or lens-shaped body with a diameter equal to one quarter to one half that of a red corpuscle. He states, in opposition to Hayem, that these "plates" are not biconcave and are perfectly destitute of hæmoglobin. Laker states that the disks, while devoid of color, are biconcave in shape, but agrees with Bizzozero that they cannot be considered an intermediate stage in the development of red corpuscles. Laker gives the following method for obtaining a view of the colorless plates: Place a drop of Hayem's preservative fluid on the microscope slide and a drop of blood upon the cover glass and lay the latter upon the slide so that the edges of the two drops shall come into contact; then by means of a slip of filter paper at the side of the cover glass opposite to the drop of preservative fluid, remove as many of the red corpuscles as possible; or, place the two drops upon the slide and lay the cover glass on from the side of the preservative fluid, then drain. The formula for Hayem's preservative liquid is, distilled water 200 parts, sodium chloride 1, soda 5, sublimate 0.5 or osmic acid 1 per cent. Norris, who claims to have described the colorless disks under the name of "invisible corpuscles" as far back as 1878, commonly studies the drop of pure

¹ This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.

blood enclosed between two surfaces, one of which is concave; the latter may be obtained either by using a curved cover glass or by making a depression in the slide. Norris recommends a 5 p. c. solution of sulphate of soda as an excellent preservative for the extremely delicate "invisible corpuscles." The special interest of Bizzozero's work lies in the relation supposed by him to exist between the colorless corpuscles and the coagulation of the blood. This author believes the fibrin to be derived from the disintegration of the colorless disks, and the following are the principal arguments introduced by him in support of this view:

1. Liquids which have a tendency to prevent coagulation preserve also more or less completely the blood plates from destruction; among these liquids are solutions of sodium sulphate, magnesium sulphate, sodium nitrate, strong sodium bicarbonate, dilute sodium carbonate, glycerine, and 0.75 per cent sodium chloride to which some methyl violet has been added.

2. Experiments made upon blood kept within the uninjured blood-vessel, after the manner of Brücke, showed that as long as the blood remained uncoagulated, the blood plates kept their shape, while the rapid coagulation of shed blood was always preceded by a destruction of the plates and the formation of granular masses from them.

3. When a drop or two of blood was whipped with slender threads for about 50-55 seconds, the threads then withdrawn and slightly washed with 0.75 per cent sodium chloride containing methyl violet, and then examined under the microscope in the same liquid, they were found covered with a layer of "plates" together with some white corpuscles. If the whipping was continued longer the layer of plates became a granular mass or was transformed into a film of fibrin. He was able to a certain extent to watch this process, the deposition of the plates, their fusion into a granular mass and the subsequent formation of fibrin, by observing under the microscope a thread placed in a slow current of blood, thus reversing the process of whipping.

4. When to a liquid containing fibrinogen and fibrinoplastin only, some of the colorless blood plates adhering to a thread were added, coagulation followed; the mere presence of a foreign body, as a thread, was shown to have no effect. The coagulation was not owing to the few red corpuscles which it was impossible to wash off the thread, for if large quantities of them alone are added to the mixture of fibrin factors, the clot formed is insignificant or wanting altogether. The clot was not due to the leucocytes adhering to the thread, for when bits of tissue, rich in bodies such as the spleen, lymph glands, red medulla of bone, etc., were added to the "proplastic" liquid, no coagulation resulted, except in the case of the last substance, which sometimes caused a slight coagulum. The conclusion is, that until the white blood corpuscles are shown to be different from the leucocytes,

this experiment must be regarded as conclusive evidence that the plates have the chief rôle in coagulation.

Experiments made upon animals with nucleated red corpuscles, birds and amphibia, showed the presence of a pale nucleated blood plate, differing from the white corpuscles, and which has functions similar to those of the mammalian blood plate already described.—*W. H. Howell.*

DIGESTION OF MEATS AND MILK.—Jessen has carried out a series of experiments to determine the time necessary for the digestion of equal quantities of different meats and of milk. Three different methods were employed in the investigation: 1. Artificial digestion; 2. Introduction of the meats into the stomach of a living dog by means of a fistula; 3. Upon a healthy man, allowing him to swallow the foods used and ascertaining the time of digestion by means of the stomach pump. The results obtained by the different methods were, on the whole, uniform, as far as the relative time necessary for digestion in each case was concerned, and may be stated as follows: Raw beef and mutton were digested most quickly; for half-boiled beef and raw veal, a longer time is necessary; thoroughly boiled and half-roasted beef, raw pork and sour cow's milk followed next; fresh cow's milk, skimmed milk and goat's milk were still less easily digested; while the longest time was required for thoroughly roasted meats and boiled milk.—*Science.*

ANIMAL CHLOROPHYLL.—Th. W. Engelmann has investigated the function of the coloring matter of the green *Vorticella*, and comes to the conclusion that it possesses fully the physiological powers of vegetable chlorophyll, causing the evolution of oxygen under the influence of sunlight and probably serving the animal as an organ of assimilation. This view is contradictory to the belief of most of those who have investigated this subject, which is, that chlorophyll found in animal protoplasm is really of vegetable origin maintaining a more or less parasitic residence in it.

PSYCHOLOGY.

THE INTELLIGENCE OF THE AMERICAN TURRET SPIDER.—The Rev. H. C. McCook exhibited nests of *Tarentula arenicola* Scudder, a species of ground spiders of the family Lycosidæ, popularly known as the turret spider. These nests, in natural site, are surmounted by structures which quite closely resemble miniature old-fashioned chimneys, composed of mud and crossed sticks, as seen in the log cabins of pioneer settlers. From half an inch to one inch of the tube projects above ground, while it extends straight downwards twelve or more inches into the earth. The projecting portion or turret is in the form of a pentagon, more or less regular, and is built up of bits of grass, stalks of straw, small twigs, &c., laid across each other at the corners. The upper and